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IS 13630-4 (2006): Ceramic Tiles - Methods of Test, Sampling and Basis of Acceptance, Part 4: Determination of linear thermal expansion (see IS 13630 : Parts 1 to 15) [CED 5: Flooring, Wall Finishing and Roofing]



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“Knowledge is such a treasure which cannot be stolen”

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IS 13630 (Part 4) : 2006

भारतीय मानक
सिरैमिक टाईलें - परीक्षण पद्धतियाँ,
नमूने लेने तथा स्वीकार्यता का आधार
(पहला पुनरीक्षण)

Indian Standard

CERAMIC TILES — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE

(First Revision)

ICS 91.100.23

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Parts 1 to 15) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in various parts in 1992-93. This is the first revision; having all parts combined in one publication, of the standard in which the following major changes have been incorporated:

- a) As per the decision taken in the last meeting, the requirements of all the parts have been included in one volume and the revised standard has been brought in line with ISO 10545 (various parts).
- b) The requirements for determination of bulk density have been added in Part 2 and a few changes have been made in the requirements for determination of water absorption.
- c) A few modifications have also been made in Part 3.
- d) Requirements for determination of breaking strength have also been added in Part 6.
- e) Requirements for determination of glazing resistance tests have also been modified in Part 9.
- f) A new test for determination of impact resistance by measurement of co-efficient of restitution has been added as Part 14.
- g) IS 13711 : 1993 'Sampling and basis for acceptance' has been amalgamated with Part 15 of this standard.

In formulation of this standard considerable assistance have been derived from the following standards:

- ISO 10545-1 : 1995 Ceramic tiles — Part 1 : Sampling and basis for acceptance
- ISO 10545-2 : 1995 Ceramic tiles — Part 2 : Determination of dimensions and surface quality
- ISO 10545-3 : 1995 Ceramic tiles — Part 3 : Determination of water absorption, apparent porosity, apparent relative density and bulk density
- ISO 10545-4 : 2004 Ceramic tiles — Part 4 : Determination of modulus of rupture and breaking strength
- ISO 10545-5 : 1996 Ceramic tiles — Part 5 : Determination of impact resistance by measurement of coefficient of restitution
- ISO 10545-6 : 1995 Ceramic tiles — Part 6 : Determination of resistance to deep abrasion for unglazed tiles
- ISO 10545-7 : 1996 Ceramic tiles — Part 7 : Determination of resistance to surface abrasion for glazed tiles
- ISO 10545-8 : 1994 Ceramic tiles — Part 8 : Determination of linear thermal expansion
- ISO 10545-9 : 2004 Ceramic tiles — Part 9 : Determination of resistance to thermal shock
- ISO 10545-10 : 1995 Ceramic tiles — Part 10 : Determination of moisture expansion
- ISO 10545-11 : 1994 Ceramic tiles — Part 11 : Determination of crazing resistance for glazed tiles
- ISO 10545-12 : 1995 Ceramic tiles — Part 12 : Determination of frost resistance
- ISO 10545-13 : 1995 Ceramic tiles — Part 13 : Determination of chemical resistance
- ISO 10545-14 : 1995 Ceramic tiles — Part 14 : Determination of resistance to stains
- ISO 13006 : 1998 Ceramic tiles — Definitions, classification, characteristics and marking

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***CERAMIC TILES — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE****PART 4 DETERMINATION OF LINEAR THERMAL EXPANSION***(First Revision)***1 SCOPE**

This standard (Part 4) covers a method of test for determining the coefficient of linear thermal expansion of all ceramic tiles.

2 PRINCIPLE

The coefficient of linear thermal expansion is determined for the temperature range from ambient temperature to 100°C.

3 APPARATUS**3.1 Suitable Calibrated Thermal Expansion Apparatus**

The apparatus should be capable of heating at the rate of 3°C/min with uniform distribution of heat to a test specimen. Certain types of apparatus require a soaking time at 100°C.

3.2 Vernier Callipers

3.3 Drying Oven — Capable of operating at 110 ± 5°C.

3.4 Desiccator**4 TEST SPECIMENS**

4.1 Two test specimens shall be cut at right angles from the central portion of one tile so that their lengths are suitable for the apparatus.

4.2 The end of the test specimens shall be ground flat and parallel.

4.3 The test specimens are ground to make the length of specimen equal to 25.4 ± 1 mm and diameter equal to 10 ± 1 mm. Alternatively, the size of the test specimen should be according to the requirement of the apparatus.

4.4 In the case of glazed tiles, the glaze shall be ground off the test specimens or alternatively unglazed

tiles fired along with the normal production may be used.

5 PROCEDURE

5.1 Dry the test specimens at 110 ± 5°C until they reach constant mass, that is, when the difference between two successive weighing at intervals of 24 h is less than 0.1 percent. Then allow them to cool in a desiccator at ambient temperature.

5.2 Using Vernier calipers, determine the length to an accuracy of 0.002 times of the length.

5.3 Place a test specimen in the apparatus and note the ambient temperature.

5.4 Initially and throughout the heating procedure, measure the length to an accuracy of 0.01 mm.

5.5 The rate of heating shall be 3°C/min.

6 EXPRESSION OF RESULTS

6.1 The coefficient of linear expansion (α) is expressed to the first decimal place $\times 10^{-6}/^{\circ}\text{C}$ in accordance with the expression:

$$\alpha = \frac{1}{l_0} \times \frac{\Delta l}{\Delta t}$$

where

l_0 = length of test specimens at the ambient temperature;

Δl = increase in the length of the test specimen; and

Δt = rise in temperature.

7 TEST REPORT

The test report shall contain the following:

- a) Brief description of the apparatus;
- b) Description of the tiles; and
- c) Coefficient of linear thermal expansion for both test specimens.

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This Indian Standard has been developed from Doc: No. CED 5 (7358 to 7372).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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